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United States Patent [19]**Poutasse**[11] **Patent Number:** **6,132,851**[45] **Date of Patent:** **Oct. 17, 2000**[54] **ADHESIVE COMPOSITIONS AND COPPER
FOILS AND COPPER CLAD LAMINATES
USING SAME**[75] **Inventor:** Charles A. Poutasse, Cleveland, Ohio[73] **Assignee:** GA-TEK Inc., Eastlake, Ohio[21] **Appl. No.:** 08/267,877[22] **Filed:** Jun. 28, 1994[51] **Int. Cl.⁷** B32B 3/00[52] **U.S. Cl.** 428/209; 428/408; 428/413;
428/417; 428/418; 428/446; 428/457; 428/901;
525/109; 525/113[58] **Field of Search** 525/113, 109,
525/107; 428/36, 245, 271, 272, 273, 901,
209, 408, 413, 417, 418, 252, 444, 457,
446, 409; 156/64[56] **References Cited****U.S. PATENT DOCUMENTS**

3,496,130	2/1970	Wasem et al.	260/26
3,935,053	1/1976	Armstrong	156/64
4,020,225	4/1977	Fujiwara	428/901
4,246,162	1/1981	Schreiber	260/37
4,343,843	8/1982	Johnson	428/272
5,061,550	10/1991	Shimizu	428/209
5,071,914	12/1991	Zimmel	525/113

FOREIGN PATENT DOCUMENTS

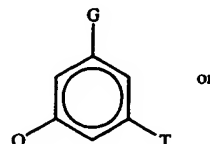
0012714	6/1980	European Pat. Off.
0148493	8/1986	European Pat. Off.
0371242	6/1990	European Pat. Off.
62-101674	5/1987	Japan

OTHER PUBLICATIONS

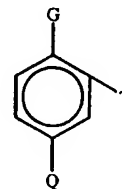
Search Report for European Appl. 95304380.9.
Epoxy Resins, Chem. & Tech., May, 8, 1989 Marcel Dekker
Inc., pp. 683-691, 1089-1095.

Primary Examiner—William Krynski*Attorney, Agent, or Firm*—Michael A. Centanni[57] **ABSTRACT**

This invention relates to an adhesive composition, comprising: (A) at least one phenolic resole resin; and (B) the product made by reacting (B-1) at least one difunctional epoxy resin, with (B-2) at least one compound represented by the formula



or



wherein in Formulae (I) and (II): G, T and Q are each independently functional groups selected from the group consisting of COOH, OH, SH, NH₂, NHR¹, (NHC(=NH))_mNH₂, R²COOH, NR¹₂, C(O)NHR¹, R²NR¹₂, R²OH, R²SH, R²NH₂ and R²NHR¹, wherein R¹ is a hydrocarbon group, R² is an alkylene or alkylidene group and m is a number in the range of 1 to about 4; T can also be R¹, OR¹ or SO₂C₆H₄—NH₂; and Q can also be H. The invention also relates to copper foils having the foregoing adhesive composition adhered to at least one side thereof to enhance the adhesion between said foils and dielectric substrates. The invention also relates to laminates comprising copper foil, a dielectric substrate, and an adhesion-promoting layer comprising the foregoing adhesive composition disposed between and adhered to the foil and the substrate.

19 Claims, No Drawings